

Joseph Moylan

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In  
The United States Patent  
And  
Trademark Office.

In Re to Patent Application #10/782,353 by  
Applicant Jay Carter, Burkburnett, TX.  
Published on the USPTO public database  
on Nov. 25 2004.

With associated correspondence address:  
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Application Filed on 2-19-2004  
For: "Tilting Mast In a Rotorcraft"

Submission of Prior Art under 37 CFR 1.501

Sir, I submit the above-identified Patent  
Application#10/782,353 and the following  
prior art, Pat#5,740,987 which is believed  
pertinent and applicable to the patent  
application pending and is believed to have  
a bearing on the patentability of at least  
claims 1, 2 and 3 in regard to said patent  
application pending.

(Prior art)  
Morris et al U.S. #5,740,987

The Patent of Morris et al discloses means  
for tilting of a helicopter rotor, shaft and  
cyclic and collective controls simultaneously  
and independent or relative to a  
fuselage/body & transmission, drive unit.

(Pending Application)  
With regard to the Carter et al Application  
#10/782,353 wherein claim 1 reads...

1. a rotorcraft including:  
a fuselage;  
a tilting mast including a driveshaft  
extending upward from the fuselage and  
tilting a mast frame to tilt the tilting mast  
relative to the fuselage, the rotor being  
carried by the tilting mast.

2. The rotorcraft defined in claim 1, further  
comprising, a cyclic control;

a spindle mounted to the tilting mast frame  
for supporting the rotor and to connect the  
rotor to the cyclic control, the cyclic control,  
spindle and rotor being carried by the tilting  
mast; and wherein the tilting mast frame  
provides input to the cyclic control.

Now with regard to Morris et al #5,740,987  
wherein the following claims are made with  
regard to tilting of a helicopter (rotorcraft)  
mast.

Claim 1-E(IV) Discloses means for  
attachment to a helicopter body.

IV. the upper shaft having a means for  
attachment to a means for translating  
rotational motion to rotational motion, the  
means for attachment being located at the  
proximal end.

Claim 2. (Morris et al Pat#5,740,987).

2. A method for redirecting thrust  
comprising:

A. tilting a helicopter upper shaft relative to a  
stable body means, thereby altering a first  
vertical axis, the first vertical axis being  
defined as the vertical, longitudinal axis of  
the helicopter upper shaft, the upper shaft  
being attached at a distal end to a helicopter  
rotor blade assembly, and at a proximal end  
to a means for translating rotational motion  
produced by a motor and transmission to  
rotational motion of the helicopter rotor  
blade assembly, the altering of the vertical  
axis relative to the stable body means  
producing an acute angle between the first  
vertical axis and a horizontal plane defined  
by a line running through a point at the nose  
of the helicopter and a point at the tail of the  
helicopter, and a line running through a point  
at the port side of the helicopter and a point  
on the starboard side of the helicopter, the  
altering of the first vertical axis relative to the  
horizontal plane redirecting the thrust  
created by the helicopter rotor blade  
assembly;

B. maintaining a focal point irrespective of  
the tilting of the upper rotor shaft,

1. the focal point being locatable at an  
intersection of the means for attachment to  
the means for translating rotational motion to

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rotational motion and the means for translating rotational motion to rotational motion.

(Prior Art)

Claim 3 of Morris et al.

3. A method for redirecting helicopter rotor thrust comprising:

A. maintaining a helicopter body means stable relative to a horizontal plane defined by line running through a point at a nose of a helicopter and a point at a tail of the helicopter, and a line running through a point at a port side of the helicopter and a point on a starboard side of the helicopter;

B. locating a means for translating rotational motion to rotational motion between a proximal end of a helicopter upper rotor shaft, and a means for providing rotational motion,

I. the helicopter rotor shaft having at a distal end a rotor, the rotor having rotor blades;

C. tilting the helicopter upper rotor shaft relative to the horizontal plane,

I. the tilting of the upper rotor shaft relative to the horizontal plane redirecting thrust produced by the rotor blades;

II. the means for translating rotational motion to rotational motion permitting the helicopter upper shaft to tilt while the helicopter body means remains stable relative to the horizontal plane;

D. maintaining a focal point irrespective of the tilting of the upper rotor shaft,

I. the focal point being locatable at an intersection of the means for attachment to the means for translating rotational motion to rotational motion and the means for translating rotational motion to rotational motion.

The prior art shown in Morris et al discloses a means for tilting a helicopter (rotorcraft) shaft relative to a body or fuselage. Morris et al further discloses that a focal point must be created and controlled.

With regard to Carter application#10/782,353, there is a focal point that is created by the nature of the design and it must be maintained irrespective of any tilting of an upper shaft. Morris et al discloses the ability of locating the focal point in both claims 2 and 3.

Carter Application#10/782,383 anticipates a focal point location in their claim 3. Carter et al further anticipate a necessity to maintain such focal point by the construction of an tilting mast frame to house said tilting mast.

Carter et al. Application#10/782,353  
Claim 3.

3. The rotorcraft defined in claim 2, wherein the tilting mast frame is pivotally connected to the spindle and a first fixed location on the fuselage and the cyclic control is pivotally connected to the spindle and a second fixed location on the fuselage, separate and spaced apart from the first fixed location on the fuselage, and wherein the tilting mast frame and cyclic control tilt simultaneously.

As far as Carter application#10/782,353 are concerned, Claims 1-3 clearly anticipate the claimed subject matter under Morris et al and anticipate the claims of Morris et al under 35 USC 102(b).

#### Arguments:

Carter et al Application#10/782,353, have submitted an application for US Patent before the PTO on a Tilting Mast in a Rotorcraft. The Patent application descriptions and claims make it very clear that the applicant intends to tilt an assembly comprising of a rotor blade(s), rotor hub(s), rotor shaft, cyclic & collective controls all as a single unit relative to a helicopter or rotorcraft body or fuselage.

Morris et al clearly has disclosed in the patent #5,740,987 and associated descriptions and claims, a means for tilting, as a single unit, an assembly comprising a set of rotor blade(s), a rotor hub(s), rotor shaft, Cyclic & Collective controls, relative to a fuselage/body in a helicopter/rotorcraft.

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Carter et al further anticipate keeping the rotorcraft at a level attitude during all flight regimes by pivoting or tilting a rotor mast independent from the rotorcraft body/fuselage. In order to obtain this, some type of focal point must be both created and maintained.

The creation of the focal point is disclosed in Morris et al in US Patent #5,740,980 in Claim 1-E-IV, c, and claims 2 and 3. The purpose of the focal point is to maintain the structural integrity of any rotorcraft or associated machine to which such a device may be incorporated, so that normal operational stresses are not allowed to increase to a point that will cause catastrophic failure of the drive shaft's universal or constant velocity joints. Hence the purpose of the tilting mast frame for the tilting mast.

Morris et al, already discloses means for providing such in claims 2 & 3 and by its associated descriptions in the following:

First vertical axis. First horizontal axis:  
Col 2 lines 19-24

Redirection of thrust & tilting of an vertical axis and associated mounting is disclosed in: Col 2 lines 24-39.

The associated descriptions of cyclic and collective controls are described in col 2 lines 47-55

Precise geometric shape is disclosed in Col 5 lines 31-36. While the descriptions are for a rotor disc control plate, carter et al essential has a rotor disc control frame to perform the same function of tilting a mast to maintain a level fuselage attitude.

Corresponding changes in fuselage/body movement by tilting of an upper rotor shaft is in Col 8 lines 58-59.

Retention of the upper shaft of carter et al Requires that rotor blade connected to a rotor hub are further connected to a spindle that is pivotally attached to the top portion of the tilting mast frame. The lower portion of the tilting mast frame is further pivotally attached to the fuselage.

With regard to Morris et al, the rotor blade(s) are connected to a rotor hub that is connected to a rotor shaft, the rotor shaft is rotatably connected to the rotor disc control plate. The rotor disc control plates is designed to be pivotally attached to a fuselage/body to allow for the tilting to occur by means of pivotal attachment points and a universal coupling between the upper rotor shaft and the means to provide for rotational motion.

It is therefore considered pertinent that the prior art of Morris et al, US Patent#5,740,987 be carefully looked at. Whether the upper rotor shaft in carter et al is tilting by a frame or a rotor disc control plate or by independent actuators would be irrelevant by the means, the same function of tilting a mast relative to the fuselage or body remains the same.

It is with this that I Respectfully submit this citation of prior art,



Joseph Moylan  
Patent Owner #5,740,976

PTO/SB/123 (09-04)

Approved for use through 11/30/2005. OMB 0651-0035  
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Patent Number	5,740,987
Issue Date	4-21-1998
Application Number	
Filing Date	Dec 1 1995
First Named Inventor	Joseph Morris
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